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## ***Interactive comment on “Observed response of the marine atmospheric boundary layer to the Southern Ocean fronts during the IPY BGH 2008 cruise” by C. Messager et al.***

**Anonymous Referee #2**

Received and published: 4 May 2012

This paper presents air-sea fluxes observed during a 2008 summer cruise and puts them in relation with atmospheric (synoptic systems) and oceanographic (hermal fronts/structures) encountered along the cruise.

My principal comment is that it reads mostly as a cruise report, and thus it is rather hard to extract specific scientific information (the presentation been sequential in time). I cant judge if the format adopted of a report is acceptable in Ocean Sciences.

I also found the title of chapter 4 'Ocean fronts and MABL' somewhat misleading of the much more varied contents of the chapter . The difficulty with the current chapter 4 seems to me that the data mix what is relatively directly the response of MABL to

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ocean fronts to what is synoptic variability and diurnal cycles. This is quite honestly recognized by the authors, but makes it really difficult to read.

What is presented certainly represents a very large instrumental and sampling effort on the air-sea fluxes in an austral area rarely investigated in such a comprehensive way, and thus the material could provide the scope for a paper.

I would suggest that instead of presenting everything along the section, a selection of cases be investigated, where the different components can be clearly separated and identified (a case of clear frontal influence, maybe with eddy M; a case of diurnal cycle and inference on MABL structure; possibly a case when the changes across fronts are masked by synoptic variability). For M, maybe the information could be complemented with other satellite meteorological/ocean data in order to provide some background on the representativeness of the characteristics of MABL response found during the cruise (Quicksat, AMSR).

This would imply, instead of presenting all radiosonde profiles on figures 3/4, to present individual profiles corresponding to each case study investigated (at least the lower atmospheric part of them).

Maybe also some considerations on the meridional structure over the cruise time (in addition to providing an Bowen ratio of the average heat fluxes, which frankly does not mean much), although this might be a little tricky. (note that on the figures, one does not see separately sensible and latent heat flux terms). Maybe, a more specific investigation of the relative direction of the wind (and meridional T gradient?) on the heat fluxes (latent+sensible, at least) and stability of MABL (this is commented in different places, but remains very qualitative).

Specific comments:

On figures 2 and following: is SST referring to the skin (M-AERI) or the bulk quantity? (last line on page 1395 and first line of page 1396 are ambiguous).

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Last par. of page 1398 and first par. of page 1399 are too general and convoluted.

Often, sentences in section 4 are too general (example: lines 6-9 of page 1401) Sentences on lines 21-23 of page 1401 are contradictory.

Page 1402, line 22: provide the magnitude of LHF outside the eddy.

The conclusions are too general, and thus do not specifically pertain to the material presented.

The paper's English should be further edited by a native speaker (rewording of 'SST gpa' 'LLJ nose', dates...)

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Interactive comment on Ocean Sci. Discuss., 9, 1387, 2012.

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